The Role of Feedback in Preparation for Future Learning: A Case Study in Learning by Teaching Environments

This paper is an exploration of the role that Feedback plays in the effectiveness of learning environments. The learning environment used in this paper is called Teachable Agent (TA) and it tasks the user with educating a virtual student. To teach the TA the user creates a concept map of the knowledge. Following this the TA is then tested to see if the user has successfully taught it. The end result is that the TA can correctly answer a final exam. While they have been proven to be an effective way to teach, some target audiences of TAs - such as 5th grade students - are unable to self-assess. Therefore the type of feedback given from TAs is crucial to the learning process. In this study the TA used is called Betty’s Brain. Betty can give three different forms of feedback to the user. The first type is corrective feedback which more explicitly addresses the knowledge in the concept map that the child has built for Betty. It will identify which parts of the concept map are incorrect and ask the child to research related areas in-order to fix their mistakes. It can provide hints that are general or very specific. The other type of feedback is metacognitive feedback which is aimed at teaching children problem solving and new strategies for learning. In this case Betty will give feedback relating more to the mechanics of the program - such as asking to be tested before taking the final exam - rather than feedback relating to the knowledge. In this study this feedback took two different forms: cognitive - Betty more specifically points out her concern - and affective - Betty is more vague and tells the user how she “feels” instead of what she thinks is wrong.

Positives

Introduction effectively explains the concept of TAs including why they are effective and why it is important to determine the type of feedback which is most effective. This is followed by a section which effectively explains the mechanics and interactions of - the TA they are using in this experiment - Betty’s Brain. This is followed by a review of previous studies that is used as a basis for a hypothesis of the results of their study. The concluded paragraph is a continuation of the introduction and explores the potential future of TAs and why TAs are effective.

Negatives

A flaw in the study is that it tries to cover too much ground. If it had focussed on one area - either corrective feedback or meta-cognitive feedback - then the results would have been much clearer and easier to understand. The results are heavy on statistics which potentially could overwhelm inexperienced readers. In one table it isn’t clear what sessions line-up to which results. The paper also doesn’t explain certain terms such as metacognitive strategies, domain-knowledge and self-regulated learning. However as the paper is meant for a conference audience, it is a given that some specialised terms might appear.